

## **Developing Superior Survey Protocols for Monitoring Population size of Two Endangered Waterbirds (Hawaiian Moorhen and Hawaiian Coot).**

The 'ālae 'ula or Hawaiian moorhen is a small, striking waterbird (Family: Rallidae), and is one of 12 recognized subspecies; *G. c. sandvicensis*, endemic to Hawai'i. 'Alae 'ula (Hawaiian moorhen) is very similar to its North American relative in appearance. In Hawaiian mythology, a moorhen brought fire to humans, which explains the red on its forehead, a symbol of the scorching from the fire. The species' life history and breeding biology are poorly known. The species uses a variety of freshwater habitats and can be somewhat secretive, although it is often seen swimming across open water. 'Alae 'ula generally occur in wetland habitats below 125 meters (410 feet) elevation on the islands of Kaua'i and O'ahu. 'Alae 'ula are quite secretive and current survey methods are inadequate to accurately estimate population size. Island-wide population, based on semiannual waterbird counts coordinated by the Hawaii Department of Fish and Wildlife (DOFAW), suggests that the population is increasing, but count numbers are variable. Between 1993 and 2003, the average annual number of 'ālae 'ula (Hawaiian moorhen) counted has been just under 300 individuals. The species was common at the turn of the last century, but by the 1940s its status was considered precarious. National Wildlife Refuges on both Oahu and Kauai support the vast majority of the world's 'ālae 'ula.

The 'ālae ke'oke'o or Hawaiian coot is a small waterbird (Family: Rallidae) endemic to Hawai'i. Adult males and females have a black head, a slate gray body with white undertail feathers, and a prominent white frontal shield and bill; feet are lobed rather than webbed and are greenish-gray. The Native Hawaiian considered 'ālae ke'oke'o (Hawaiian coot) to be a deity, but also considered it good to eat. Island-wide population, based on semi-annual waterbird counts conducted by DOFAW, suggests that the population is stable and is estimated at between 2,000 and 4,000 individuals. Similar to the rest of Hawaiian native waterbirds, 'ālae 'ula (Hawaiian moorhen) and 'ālae ke'oke'o (Hawaiian coot) are threatened by: wetland loss, non-native invasive plants, environmental contaminants, introduced avian diseases, and introduced mammalian predators.

### **'Alae 'ula (Moorhen) Monitoring Protocol Development.**

'Alae 'ula are quite secretive and current survey methods are inadequate to accurately estimate population size. We will trap and band as many adult and juvenile individuals as can be trapped during the course of the project. We will place GPS data-loggers on 10 adult birds at James Campbell NWR in order to track movements. The birds will be tracked over the course of 6-12 months and the data will be used to answer the following questions:

1. What habitat types are used during the different seasons? This will help to refine the survey protocol dependent on the time of year.

2. What is the home-range of adult individuals? How much overlap between individuals?  
This will contribute to refining the spatial component of the survey protocol.
3. Detectability? We can use the tracked and banded individuals to refine estimates of detectability.

We will use these data to develop a monitoring protocol for the Hawaiian moorhen that will allow for more accurate refuge and statewide population estimates. While developing a better method to census individuals is the primary target of this investigation, we will also learn valuable information about moorhen response to management actions that is not currently understood. How do birds respond to fluctuations in water levels, predator management, and differing water salinities? These data will be used across refuges in Hawaii for wetland management actions.

### **Alae ke'oke'o (Hawaiian coot) Monitoring Protocol Development.**

Alae ke'oke'o are much more likely to travel than the 'alae 'ula (Hawaiian moorhen). Movement both within an island and between islands is not well understood. This affects the ability to accurately census the population. The goal of this component of the project will be to better understand large-scale movements of the coots. This will occur as birds are banded on the James Campbell and Pearl Harbor Refuges and fitted with Satellite PTT trackers. A band resight program utilizing volunteers based on each of the islands will also be initiated during this study with the help of the Honolulu Ecological Services Office. We will capture and band as many birds as possible during the project. We will use the data to answer the following questions:

1. How frequently do birds move on and off the refuge?
2. How frequently do birds use sites not currently surveyed (both on and off the refuge)?
3. Where do birds go when wetland management actions decrease the available habitat?
4. Juvenile dispersal locations? Fate of dispersing juveniles.

The answers to these questions will assist in refining the current refuge waterbird survey methodologies and will provide valuable information about the response of these birds to management actions.

### **Relevance**

Both components of this project are relevant to meeting the goals and objectives identified in the CCP's for Pearl Harbor and James Campbell NWRs.

### **James Campbell CCP:**

**Goal 1. Protect and manage seasonal wetland habitats to meet the life-history needs of endangered waterbirds to promote their recovery.**

Objective 1.3. Intensively manage seasonal wetland habitat for ‘alae ke‘oke‘o and ‘alae ‘ula loafing and foraging.

Objective 1.4. Intensively manage seasonal wetland habitat for ‘alae ‘ula and ‘alae ke‘oke‘o breeding.

Objective 1.5: Manage Natural Wetland Habitat for ‘Alae ke‘oke‘o and ‘Alae ‘ula.

**Goal 4. Collect scientific information necessary to support adaptive management decisions.**

Objective 4.1. Conduct inventory, monitoring, and research to document progress and evaluate management strategies to guide management decisions.

**Pearl Harbor CCP:**

**Goal 1. Protect and manage seasonal wetland habitats to meet the life history needs of endangered waterbirds to promote their recovery and also for the benefit of migratory birds.**

Objective 1.3. Provide seasonal wetland habitat for ‘alae ke‘oke‘o and ‘alae ‘ula loafing and foraging.

Objective 1.4. Provide seasonal wetland habitat for ‘alae ‘ula and ‘alae ke‘oke‘o breeding.

**Goal 3. Collect scientific information necessary to support adaptive management decisions.**

Objective 3.1. Conduct inventory and monitoring to document progress and evaluate management strategies.

This effort also directly addresses four priorities listed in the I&M Project RFP: (1) it benefits the science information needs of multiple refuges. While monitoring will occur initially on James Campbell, the information will be useful for management and monitoring on all wetland Refuges found on Kauai and Oahu. (2) Funds requested to purchase tracking equipment can be obligated before the July 2011 deadline for purchases under 100k. (3) Our project has applicability to the statewide survey's for these endangered species which have been identified as being insufficient to estimate the actual population. 4) the project addresses resource management priorities of the Refuges, other FWS programs (T&E species, Migratory Birds, Habitat Conservation), and conservation partners (Pacific Coast Joint Venture, Hawai'i DLNR).

## **COSTS**

### Coot Component

<b>CATEGORY</b>	<b>COST</b>
<b>Supplies</b>	
Expendable supplies (capture equipment, flag bands)	\$3,000
Seven 5 g satellite transmitters	\$24,150
<b>Services</b>	
Transmitter data collection service	\$5,600
<b>TOTAL</b>	<b>\$32,750</b>

### Moorhen Component

<b>CATEGORY</b>	<b>COST</b>
<b>Supplies</b>	
Expendable supplies (capture equipment, flag bands)	\$3,000
Ten 8 g GPS data loggers	\$10,000 (Estimate)
<b>TOTAL</b>	<b>\$13,000</b>

**TOTAL (Both Components)                      \$45,750**